# Volunteer Lake Assessment Program Individual Lake Reports

## STOCKER POND, GRANTHAM, NH

**MORPHOMETRIC DATA**

| | | | | | |
|---|---|---|---|---|---|
| **Watershed Area (Ac.):** | 1,253 | **Max. Depth (m):** | 5.8 | **Flushing Rate (yr$^{-1}$):** | 3.5 |
| **Surface Area (Ac.):** | 64 | **Mean Depth (m):** | 2.7 | **P Retention Coef:** | 0.56 |
| **Shore Length (m):** | 2,600 | **Volume (m$^3$):** | 697,000 | **Elevation (ft):** | 1019 |

**TROPHIC CLASSIFICATION**

| Year | Trophic class |
|---|---|
| 1983 | MESOTROPHIC |
| 2001 | MESOTROPHIC |

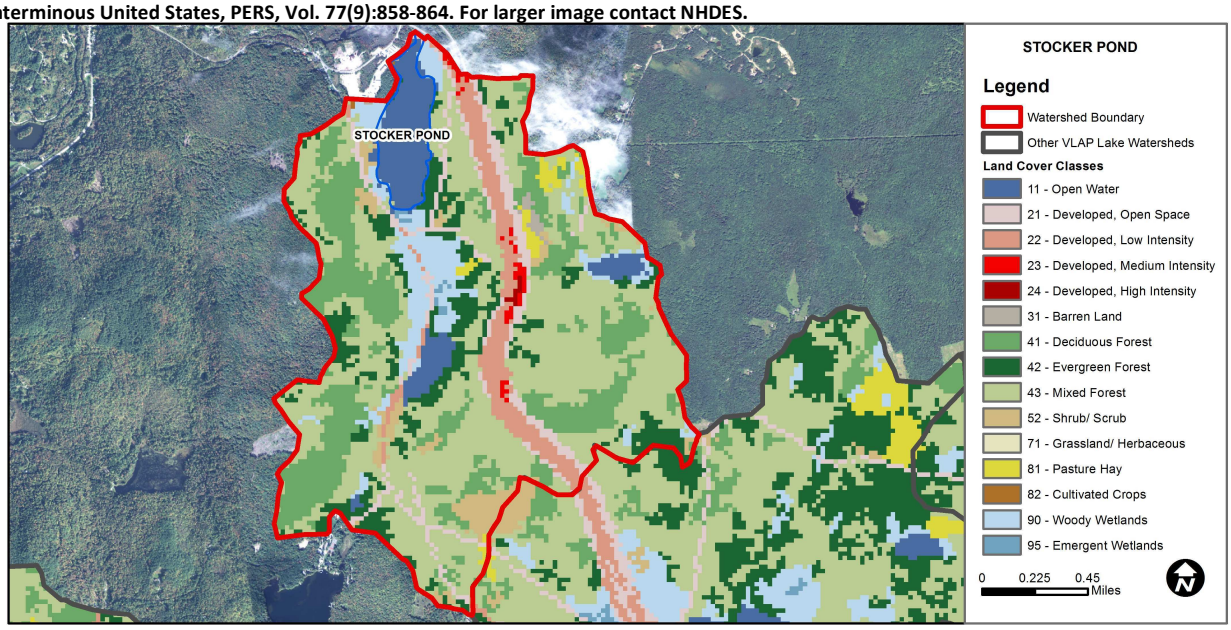
**KNOWN EXOTIC SPECIES**

**The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm**

| Designated Use | Parameter | Category | Comments |
|---|---|---|---|
| Aquatic Life | Phosphorus (Total) | Good | The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay. |
| | pH | Slightly Bad | >10% of samples exceed criteria by a small margin (minimum of 2 exceedances). |
| | Oxygen, Dissolved | Encouraging | There are < 10 samples with 0 exceedances of criteria. More data needed. |
| | Dissolved oxygen satura | Slightly Bad | There are >10% of samples (minimum of 2), exceeding criteria. |
| | Chlorophyll-a | Good | The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator. |
| Primary Contact Recreation | Escherichia coli | Very Good | Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria. |
| | Cyanobacteria hepatoto | Slightly Bad | Cyanobacteria bloom(s). |
| | Chlorophyll-a | Very Good | There are a total of at least 10 samples with 0 exceedances of indicator. |

**WATERSHED LAND USE SUMMARY**

**Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.**




| Land Cover Category | % Cover | Land Cover Category | % Cover | Land Cover Category | % Cover |
|---|---|---|---|---|---|
| Open Water | 6.8 | Barren Land | 0.38 | Grassland/Herbaceous | 0 |
| Developed-Open Space | 5.6 | Deciduous Forest | 18.47 | Pasture Hay | 1.25 |
| Developed-Low Intensity | 5.65 | Evergreen Forest | 9.99 | Cultivated Crops | 0.07 |
| Developed-Medium Intensity | 0.59 | Mixed Forest | 41.32 | Woody Wetlands | 6.42 |
| Developed-High Intensity | 0.13 | Shrub-Scrub | 3.17 | Emergent Wetlands | 0.24 |

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## Stocker Pond, Grantham

## 2014 Data Summary

**Observations and Recommendations** (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels increased slightly from July to August, were slightly greater than the state median, and decreased from 2013. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years.
- **Conductivity/Chloride:** Deep Spot, Inlet and Outlet conductivity levels remained elevated and much greater than the state median. Historical trend analysis indicates significantly increasing (worsening) epilimnetic (upper water layer) conductivity since monitoring began. Spring chloride monitoring indicated elevated chloride levels at the Allan and English Culvert stations, but much lower chloride levels at Culvert 20 and Kirk Culvert.
- **E. coli:** Inlet and Outlet E. coli levels were much less than the state standard of 406 cts/100 mL for surface waters.
- **Total Phosphorus:** Epilimnetic phosphorus levels were average and remained stable from July to August. Historical trend analysis indicates highly variable epilimnetic phosphorus since monitoring began, and visual inspection shows phosphorus levels have increased slightly since 2008. Hypolimnetic (lower water layer) phosphorus levels were low on each sampling event. Inlet and Outlet phosphorus levels were also low.
- **Transparency:** Transparency was good in July and then decreased in August likely due to wave action at the deep spot. However, historical trend analysis indicates transparency has significantly decreased (worsened) since monitoring began.
- **Turbidity:** Epilimnetic turbidity was slightly elevated in August potentially due to wind and wave action churning up the pond. Visual inspection of historical epilimnetic turbidity indicates turbidity has increased since 2004. Hypolimnetic turbidity was slightly elevated in July and August potentially due to algal growth. Inlet turbidity was elevated in July following a significant storm event and wetland flushing and Outlet turbidity was elevated in August.
- **pH:** Epilimnetic, Hypolimnetic and Inlet pH levels were less than the desirable range 6.5-8.0 units in July and then improved in August. Historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH since monitoring began.
- **Recommended Actions:** The increased frequency and intensity of storm events may be flushing wetland systems rich in organic acids that could be causing the pond to become more colored (darker) and acidic, which in turn could be causing the decreased transparency as well as potentially increasing phosphorus levels. During the biologist visit in 2015, conduct apparent color analyses on deep spot samples to compare to historical color analyses to determine if the pond may be more colored. Stormwater runoff from residential properties could also be contributing phosphorus to the pond. Educate lake residents on ways to reduce stormwater runoff from their properties utilizing DES' "NH Homeowner's Guide to Stormwater Management". Keep up the great work!

Table 1. 2014 Average Water Quality Data for STOCKER POND

| Station Name | Alk. mg/l | Chlor-a ug/l | Chloride mg/l | Cond. uS/cm | E. Coli #/100ml | Total P ug/l | Trans. m | | Turb. ntu | pH |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | NVS | VS | | |
| Epilimnion | 15.1 | 5.12 | | 181.1 | | 12 | 1.95 | 2.58 | 1.66 | 6.55 |
| Hypolimnion | | | | 187.1 | | 10 | | | 2.76 | 6.52 |
| Allan Culvert | | | 160 | | | | | | | |
| Culvert 20 | | | 29 | | | | | | | |
| English Culvert | | | 75 | | | | | | | |
| Inlet | | | | 182.4 | 10 | 8 | | | 2.96 | 6.46 |
| Kirk Culvert | | | 3 | | | | | | | |
| Outlet | | | | 185.9 | 6 | 7 | | | 2.06 | 6.66 |

**NH Median Values:** Median values for specific parameters generated from historic lake monitoring data.
**Alkalinity:** 4.9 mg/L
**Chlorophyll-a:** 4.58 mg/m$^3$
**Conductivity:** 40.0 uS/cm
**Chloride:** 4 mg/L
**Total Phosphorus:** 12 ug/L
**Transparency:** 3.2 m
**pH:** 6.6

**NH Water Quality Standards:** Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
**Chloride:** > 230 mg/L (chronic)
**E. coli:** > 88 cts/100 mL – public beach
**E. coli:** > 406 cts/100 mL – surface waters
**Turbidity:** > 10 NTU above natural level
**pH:** between 6.5-8.0 (unless naturally occurring)

### Historical Water Quality Trend Analysis

| Parameter | Trend | Explanation | Parameter | Trend | Explanation |
|---|---|---|---|---|---|
| Conductivity | Worsening | Data significantly increasing. | Chlorophyll-a | Stable | Trend not significant; data moderately variable. |
| pH (epilimnion) | Worsening | Data significantly decreasing. | Transparency | Worsening | Data significantly decreasing. |
| | | | Phosphorus (epilimnion) | Stable | Trend not significant; data highly variable. |